A revision of *Nyctemera kebeae* (BETHUNE-BAKER, 1904) (with descriptions of two new subspecies) and *N. warmasina* (BETHUNE-BAKER, 1910) (Lepidoptera: Arctiidae, Nyctemerinae)

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Abstract: *Nyctemera kebeae* (BETHUNE-BAKER, 1904) and *N. warmasina* (BETHUNE-BAKER, 1910), two closely related species from New Guinea, are revised. Three subspecies of *N. kebeae* are recognised and described, *N. kebeae kebeae* (BETHUNE-BAKER, 1904) (lectotype in BMNH, London) from the Owen Stanley Range (Papua New Guinea), *N. kebeae* ***intermedia*** **subsp. nov.** (holotype in ZMA, Amsterdam) from the Star Mountains (Irian Jaya) and *N. kebeae* ***occidentalis*** **subsp. nov.** (holotype in ZMA) from the western part of the Central Mountains (Irian Jaya). *Nyctemera warmasina* (holotype in BMNH), from the Arfak Mountains (Irian Jaya), is included in this revision, since it is very closely related to *N. kebeae*.

Eine Revision von *Nyctemera kebeae* (BETHUNE-BAKER, 1904), mit Beschreibung zweier neuer Unterarten, und *N. warmasina* (BETHUNE-BAKER, 1910) (Lepidoptera: Arctiidae, Nyctemerinae)

Zusammenfassung: *Nyctemera kebeae* (BETHUNE-BAKER, 1904) und *N. warmasina* (BETHUNE-BAKER, 1910), zwei nah verwandte Arten von Neuguinea, werden revidiert. Bei *N. kebae* werden drei Unterarten anerkannt und beschrieben: *N. kebeae kebeae* (BETHUNE-BAKER, 1904) (Lectotypus im BMNH, London) von der Owen Stanley Range (Papua-Neuguinea), *N. kebeae* ***intermedia*** **subsp. nov.** (Holotypus [HT] im ZMA, Amsterdam) von den Star Mountains (Indonesien: Irian Jaya) und *N. kebeae* ***occidentalis*** **subsp. nov.** (HT im ZMA) vom westlichen Teil des Zentralgebirges (Irian Jaya). *Nyctemera warmasina* (HT im BMNH) aus dem Arfak-Gebirge (Irian Jaya) wird mitbehandelt, da es ein naher Verwandter von *N. kebeae* ist.

Revisi *Nyctemera kebeae* (BETHUNE-BAKER, 1904) (dengan deskripsi baru dari dua subspecies) dan *N. warmasina* (BETHUNE-BAKER, 1910) (Lepidoptera: Arctiidae, Nyctemerinae)

Ringkasan: *Nyctemera kebeae* (BETHUNE-BAKER, 1904) dan *N. warmasina* (BETHUNE-BAKER, 1910), dua species dari New Guinea yang erat hubungannya, ditinjau kembali. Tiga subspecies dari *N. kebeae* diakui dan dideskripsi, yaitu *N. kebeae kebeae* (BETHUNE-BAKER, 1904) (lectotype di dalam BMNH, Lon-

don) dari Owen Stanley Range (Papua New Guinea), *N. kebeae* ***intermedia*** **subsp. nov.** (holotype di dalam ZMA, Amsterdam) dari Pegunungan Bintang (Irian Jaya) dan *N. kebeae* ***occidentalis*** **subsp. nov.** (holotype di dalam ZMA) dari bagian barat pegunungan sentral (Irian Jaya). *Nyctemera warmasina* (holotype di dalam BMNH), dari Pegunungan Arfak (Irian Jaya), termasuk dalam revisi ini, karena sangat erat hubungannya dengan *N. kebeae*.

Introduction

As a part of a revision of the genus *Nyctemera* HÜBNER, [1820] and allied genera, carried out by the author, *N. kebeae* (BETHUNE-BAKER, 1904) and *N. warmasina* (BETHUNE-BAKER, 1910) are revised. These two species are closely related and belong to the "*baulus*-group", as shown by the genitalia, which are described and figured. Three subspecies of *N. kebeae* are recognised, two of which are new and described in this paper. *Nyctemera kebeae* and *N. warmasina* are endemic to New Guinea and are found in mountainous areas. A distribution map is given.

The material examined is deposited in the following institutions and collections:

The Natural History Museum, London (formerly British Museum [Natural History]) (BMNH),

Nationaal Natuurhistorisch Museum, Leiden (formerly Rijksmuseum voor Natuurlijke Historie) (RMNH),

Zoölogisch Museum, Amsterdam (ZMA), and

the collection of Mr. H. J. G. VAN MASTRIGT (Sentani, Irian Jaya, Indonesia) (HVM).

Nyctemera kebeae kebeae (BETHUNE-BAKER, 1904)

Deilemera kebeae BETHUNE-BAKER (1904: 411).
Nyctemera kebeae: SEITZ (1915: 273).
Nyctemera kebeae: BRYK (1937: 66).

Material examined. Lectotype (designated hereby): ♂, "Type, British New Guinea, Dinawa, 4000 ft., IX. 1902, coll. A. E. PRATT", [BMNH]; paralectotype: 1 ♀, "Type, British Central New Guinea, Mount Kebea, 6000 ft, III-IV. 1903, coll. A. E. PRATT", [BMNH].

Further material: 1 ♂, "British New Guinea, Biagi, Mambare, 5000 ft., III. 1906, A. S. MEEK", [BMNH]; 1 ♀, "British New Guinea, Saiko, Bubu R., Upp. Waria R., 5500-6000 ft., IX. 1936, F. SHAW MAYER", [BMNH]. [In BMNH 65 further specimens (♂♂ and ♀♀) are present. Label details are not given here, but they all come from the same area.]

Description

Imago (fig. 1). Length of forewing 20–22 mm. Head black with thin yellow margins at collar, around eyes, and between antennae. Antennae black and bipectinate, male with longer pectinations than female. Labial palpi black, short and erect. Thorax dorsally black with thin yolk-yellow borders, ventrally with broader yolk-yellow borders. Legs dark grey brown, inner side of femur and tibia grey white or pale yellow. Abdominal segments black, bordered with yolk-yellow, anal segment yolk-yellow distally.

Forewing dark brown. Transversal band forming an almost round patch, extending from vein 2 to 6 and to distal part of cell. Ground-colour of transversal band pure white, hardly or not crossed by dark veins. Basal field at dorsum with extensively white streak, almost reaching vein 2.

Hind wing snow-white with rather narrow black brown margin (2–3 mm), dorsum white. Wing base black.

At the underside of the forewing the extended white of the dorsum and the transversal band join, forming a hooked band. Ground-colour of forewing and margin of hindwing black brown.

There is hardly any variation in wing pattern.

Male and female genitalia (figs. 6a–d, 7a–b). The genitalia are identical to those of *N. kebeae intermedia* and *N. kebeae occidentalis* and are described with the latter subspecies.

Distribution (fig. 10). *Nyctemera kebeae kebeae* is found in the Owen Stanley Range (Papua New Guinea), at altitudes between 1200 and 1600 meters.

Remark. From the series of the two syntypes (♂ and ♀) the ♂ is here designated as lectotype, because it was depicted by BETHUNE-BAKER (1904) in the original description. Though he mentioned "the type is in my collection", he in fact possessed two [syn-]types, also shown by the "♂♀" symbols in front of his text.

Etymology. The name *kebeae* refers to Mount Kebea in the Owen Stanley Range, where one of the syntypes was found.

Nyctemera kebeae intermedia subspec. nov.

Holotype: ♀, "Irian Jaya, Star Mts., Abmisibil, 1880 m, on light, 11-21. III. 1988, HvM" [ZMA].

Paratypes: 1 ♀, "Irian Jaya, Star Mountains, Abmisibil, R[iver] Oktanglap, 1500 m, 9-14. XI.1990, H. J. G. VAN MASTRIGT"; 2 ♀♀, "Irian Jaya, Star Mts., Abmisibil, 1880 m, on light, 11-21. III. 1988, HvM"; 1 ♂, "Irian Jaya, Abmisibil, 2000 m, 20. VIII. 1984, HvM"; 1 ♀, "Irian Jaya, Star mountains, Abmisibil, Okkim, 2000 m, 10-13. VIII. 1988, HvM"; 1 ♀, "Irian Jaya, Star Mountains, Batimban, 26-31. IX. 1990, H. J. G. VAN MASTRIGT"; 1 ♀, "Irian Jaya, Star Mountains, Batimban, R[iver] Okkim, 5. IV. 1991, H. J. G. VAN MASTRIGT" [all ZMA]; 1 ♂, "Abmisibil, 1850 m, 9. IX. 1985, Henk VAN MASTRIGT"; 1 ♀, "Abmisibil, 1850 m, 16. IX. 1985, Henk VAN MASTRIGT"; 1 ♂, "Abmisibil, 1850 m, 15. III. 1988, Henk VAN MASTRIGT"; 3 ♂♂, 1 ♀, "Abmisibil, 1850 m, 21. III. 1988, Henk VAN MASTRIGT"; 3 ♂♂, "Abmisibil, 1850 m, 9-13. XI. 1990, Henk VAN MASTRIGT"; 1 ♀, "Abmisibil, 1880 m, 16. III. 1988, Henk VAN MASTRIGT"; 1 ♀, "Batimban, river Okkim, 9. XI. 1990, H. VAN MASTRIGT"; 1 ♂, "Kobakma, 900 m, 27. VI. 1993, H. VAN MASTRIGT" [all HVM]; 1 ♀, "Sterren Gebergte, Molbakon, 11. IX. 1959, Nieuw Guinea Ned. Exp. 1959"; 1 ♀, "Sterren Gebergte, Tenma Sigin, 1800 m, 21. V. 1959, Nieuw Guinea Ned. Exp. 1959" [both RMNH].

Description

Imago (figs. 2-3). Length of forewing 21-23 mm. *Nyctemera kebeae intermedia* is very similar to *N. kebeae kebeae* (described above), especially in characters of head, thorax and genitalia. Only the differences are described.

Labial palpi black, upperside of second segment scarcely sprinkled with white or yellow scales in some specimens.

Forewing chocolate brown. Transversal band more stretched and oblique (fig. 2) than in *N. kebeae kebeae* (fig. 1); its inner margin almost straight, outer margin rounded but irregular caused by convex white pattern between vein 2 and cell. Snow-white ground-colour of transversal band not crossed by dark veins. Vein 1 and fold in basal half with white stripe, other veins brown.

Hindwing snow-white with broad black brown margin (3-3.5 mm), from vein 1 to dorsum fading and dark grey brown coloured.

Underside identical to upperside, but ground-colour of forewing and margin of hindwing black brown. First three veins and fold in basal half white.

Variability. Much variation occurs in the wing pattern of this subspecies. In some specimens the white colour of the fold is extremely extended, almost filling up the space between dorsum and vein 1 (fig. 3). It is striking that in these specimens the ground-colour of the forewing is dark brown, and closely resemble *kebeae kebeae* (fig 1), but intermediate forms exist. On the other hand some specimens almost completely lack the white on the veins and fold. Most specimens, however, are like described above.

Male and female genitalia (figs. 6a-d, 7a-b). The genitalia are identical to those of *N. kebeae kebeae* and *N. kebeae occidentalis* and descibed with the latter subspecies.

Distribution (fig. 10). *Nyctemera kebeae intermedia* is found in the Star Mountains (surroundings of Abmisibil), east of the Baliem Valley. Only one specimen has been found north of the Baliem Valley (Kobakma). It is not yet known whether and how far the distribution area of this subspecies extends eastward into Papua New Guinea. Specimens have been found at altitudes between 900 and 2000 meters.

Remark. One could think that the three subspecies of *N. kebeae* form a phenotypical cline across New Guinea from the East to the West, which would make it superfluous, maybe even unwise, to elevate "intermediate forms" to the level of subspecies. However, there are some reasons that are decisive to describe the subspecies *intermedia,* which indeed appears to be externally intermediate between *kebeae* and *occidentalis.* First of all, there is the isolation between *occidentalis* and *intermedia* by the broad gap of the Baliem Valley. *N. kebeae occidentalis* from the western part of the Central Mountains in Irian Jaya is very constant in wingpattern and clearly defined, as is *N. kebeae kebeae* in the eastern part of Papua Niugini. East of the Baliem Valley, in the Star Mountains, *N. kebeae intermedia* occurs, and what is between this area and the Owen Stanley Range is not yet known. It appears to be well possible that there is another gap in Papua New Guinea which isolates *intermedia* and *kebeae.* The fact that most specimens of *intermedia* are easily distinguished from *kebeae* (only three of the 22 specimens of *intermedia* known in total resemble *kebeae,* but still are definitively distinct) is decisive to consider them to represent two different subspecies.

Etymology. The name *intermedia* refers to the intermediate geographic position and external characters between *kebeae* and *occidentalis* n. ssp.

Nyctemera kebeae occidentalis subspec. nov.

Holotype: ♀, "Irian Jaya, Centr. Bergland, Ilaga, Nakimome, 2050-2100 m, 16. v. 1988, HvM" [ZMA].

Paratypes: 1 ♂, "Irian Jaya, Centr. Bergland, Bilogai, on light, 2050 m, 20-24. v. 1988, HvM"; 1 ♂, "Irian Jaya, Centr. Bergland, Ilaga, Nakimome, on light, 2050 m, 19. v. 1988, HvM"; 1 ♂, 5 ♀♀, "Irian Jaya, Ilaga, Nakimome, 2050-2100 m, 16. v. 1988, HvM" [all ZMA]; 1 ♂, "Ilaga, 26. x. 1983, Henk VAN MASTRIGT"; 3 ♂♂, 5 ♀♀, "Nakimome, Ilaga, 2050 m, 16. v. 1988, Henk VAN MASTRIGT"; 1 ♂, "Nakimome, Ilaga, 2150 m, 6. XI. 1985, Henk VAN MASTRIGT"; 1 ♂, "Timeepa, 1450 m, 5-10. x. 1991, Henk VAN MASTRIGT" [all HVM]; 1 ♂, "Ned. Nieuw-Guinea, Arabu-bivak, KNAG-expeditie, 21. x. 1939"; 1 ♂, "Ned. Nieuw-Guinea, Arabu-bivak, KNAG-expeditie, 28. x. 1939"; 1 ♂, "Ned. Nieuw-Guinea, Paniai, KNAG-expeditie, 2. IX. 1939"; 1 ♂, "Ned. Nieuw-Guinea, Paniai, KNAG-expeditie, 26. IX. 1939" [all RMNH].

Description

Imago (fig. 4). Length of forewing 19-21 mm. Only the differences with *N. kebeae kebeae* and *kebeae intermedia* are described.

Labial palpi black, short and erect, second segment with pale grey to pale yellow scales on upperside.

Forewing chocolate brown. Transversal band oblique with almost straight inner margin, outer margin rounded. White ground-colour of transversal band sprinkled with brown scales and crossed by dark veins. Veins in basal half of forewing pale grey brown, fold between vein 1 and 2 with thin white stripe.

Hindwing identical to that of *kebeae intermedia.*

Wing pattern at underside identical to upperside, but transversal band not sprinkled by dark scales nor crossed by dark veins. Ground-colour of fore- and hindwing black brown.

Variability. The extend of the sprinkling of brown scales in the transversal band is somewhat variable, but darker scales are always present and always at least some dark veins cross the transversal band.

Male genitalia (figs. 6a-d). The genitalia of both male and female do not differ from those of *Nyctemera kebeae kebeae* and *N. kebeae intermedia,* which have not been described before. A description is given, refering to the genitalia of *N. kebeae occidentalis.*

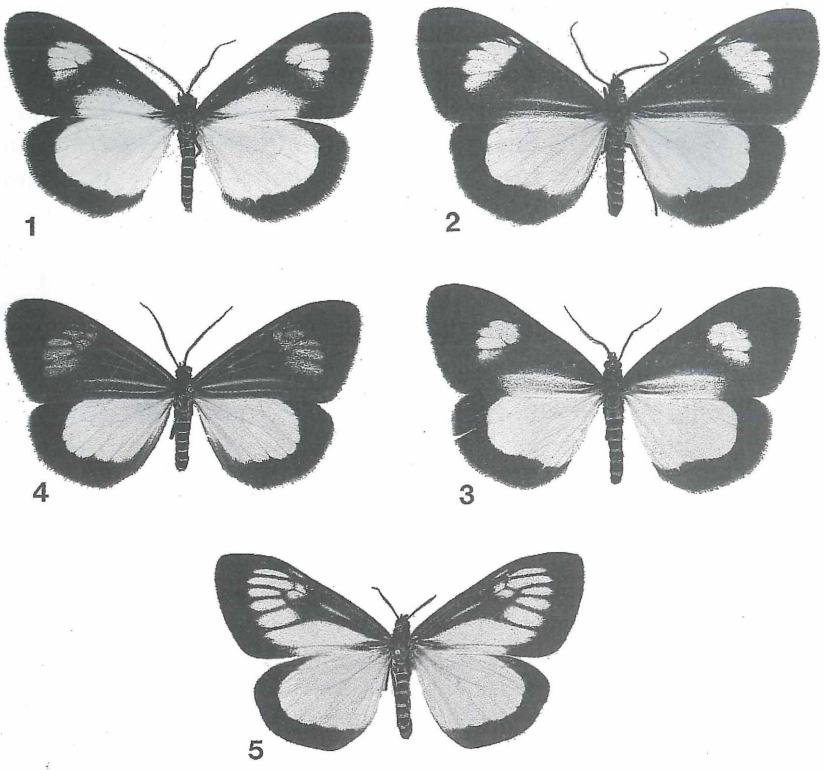
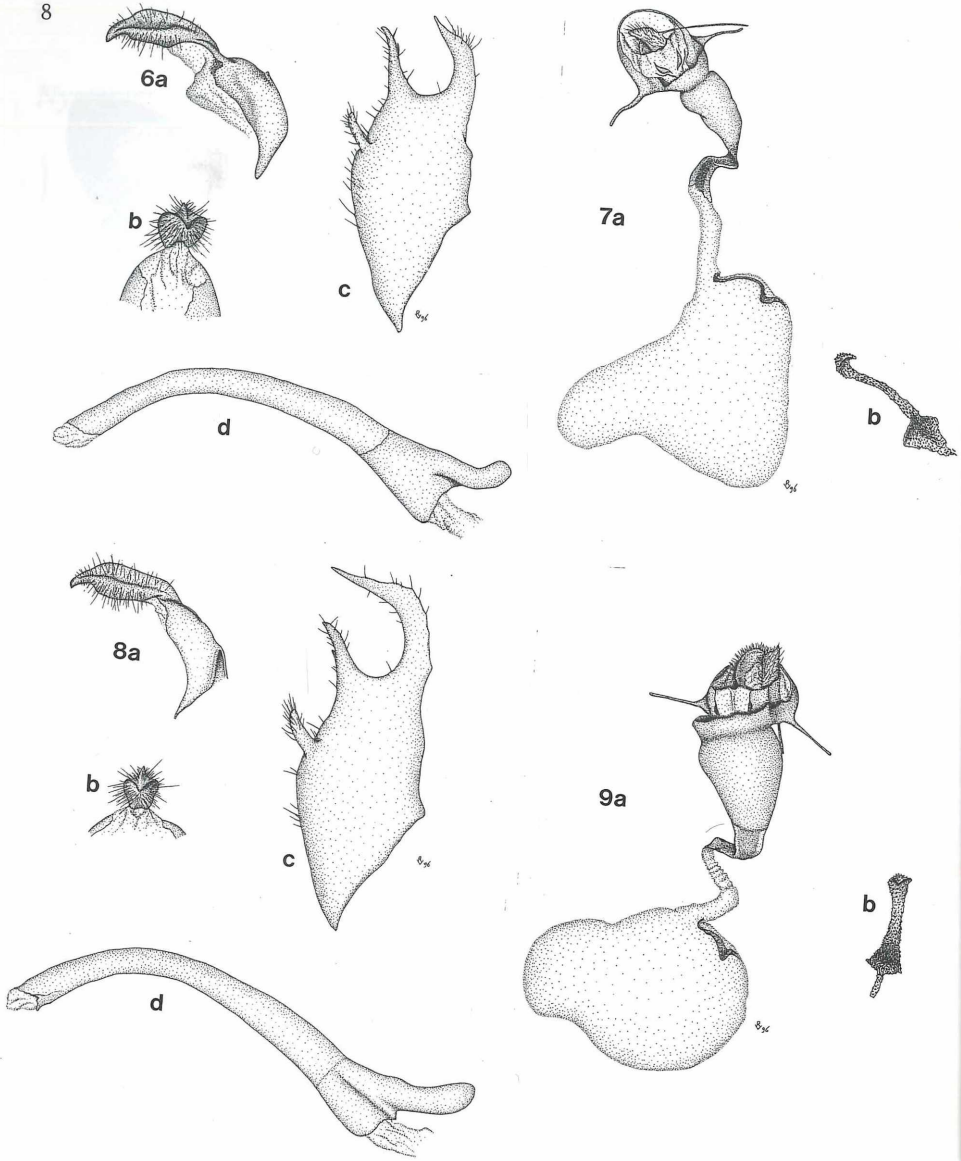


Fig. 1: *Nyctemera kebeae kebeae* (BETHUNE-BAKER, 1904), ♀ (Papua New Guinea, Saiko, Bubu River). **Fig. 2:** *N. kebeae intermedia* subspec. nov., ♀ (Irian Jaya, Star Mountains, Abmisibil, holotype). **Fig. 3:** *N. kebeae intermedia* subspec. nov., local form, ♀ (Irian Jaya, Star Mountains, Abmisibil, paratype). **Fig. 4:** *N. kebeae occidentalis* subspec. nov., ♀ (Irian Jaya, Central Highlands, Ilaga, Nakimome, holotype). **Fig. 5:** *N. warmasina* (BETHUNE-BAKER, 1910), ♀ (Irian Jaya, Arfak Mountains, Anggi-lakes).

Uncus elongate beak-shaped with a keel. This keel arched, rising just behind the blunt top of uncus (fig. 6a). Vinculum with short saccus. Juxta long, Y-shaped, its distal part granulated. Valva with three processes (fig. 6c). Process on sacculus long and thin, sometimes a bit club-shaped. Extension of sacculus long, with thorn on innerside (just visible in fig. 6c). Extension of cucullus as long as that of sacculus, robust, broad and flattened. Top of this process curved towards sharp point. Sacculus and extension of cucullus with setae. Aedeagus (fig. 6d) very long and curved down, coecum long and curved upwards. No cornuti.



Figs. 6a–d: Male genitalia of *Nyctemera kebeae* (BETHUNE-BAKER, 1904). **Fig. 6a:** uncus, lateral view. **Fig. 6b:** uncus, ventral view. **Fig. 6c:** right valva, outer side. **Fig. 6d:** aedeagus (after prep. RV 350, *N. k. occidentalis*). **Figs. 7a–b:** Female genitalia of *Nyctemera kebeae* (BETHUNE-BAKER, 1904). **Fig. 7a:** ventral view. **Fig. 7b:** signum, dorsolateral view (after prep. RV 351). **Figs. 8a–d:** Male genitalia of *Nyctemera warmasina* (BETHUNE-BAKER, 1910). **Fig. 8a:** uncus, lateral view. **Fig. 8b:** uncus, ventral view. **Fig. 8c:** right valva, outer side. **Fig. 8d:** aedeagus (after prep. RV 360). **Figs. 9a-b:** Female genitalia of *Nyctemera warmasina* (BETHUNE-BAKER, 1910). **Fig. 9a:** ventral view. **Fig. 9b:** signum, dorsal view (after prep. RV 361).

Female genitalia (figs. 7a-b). Apophyses anterior of moderate length, apophyses posterior rather long and thin. Lamella postvaginalis with rather long lunular fold. First half of antrum swollen and funnel-shaped, second half ribbon-shaped, flat with dark chitinous core. Bursa copulatrix with one signum. Signum (fig. 7b) long and at one fourth of length strongly broadened (spoon-shaped), distal part slender, curled at ductus bursae. Spoon-shaped part of signum somewhat variable.

Distribution (fig. 10). *Nyctemera kebeae occidentalis* is found in the western part of the Central Mountains (Irian Jaya), from west of the Baliem Valley to Timeepa (west of lake Paniai). It has been found at altitudes between 1450 and 2150 meters.

Etymology. The name *occidentalis* refers to the western distribution of this subspecies of *Nyctemera kebeae.*

Nyctemera warmasina (Bethune-Baker, 1910)

Deilemera warmasina Bethune-Baker (1910: 448).
Nyctemera warmasina: Seitz (1915: 274).
Nyctemera warmasina: Bryk (1937: 86).

Material examined. Holotype: ♀ [in original description wrongly identified as ♂], "Type, North New Guinea, Warmasin Lakes [= Anggi Lakes], Arfak Mountains, 6000 ft., II. 1909, C. B. Pratt" [BMNH].

Further material: 1 ♂, "North New Guinea, Anggi Lakes, Arfak Mountains, 6000 ft., I.-II. 1914, A. C. & F. Pratt"; 1 ♀, "North New Guinea, Anggi Lakes, Arfak Mountains, 6000 ft., III. 1914, A. C. & F. Pratt" [both BMNH]. [In BMNH 14 further specimens (♂♂ and ♀♀) are present. Label details are not given here, but they all come from the same area.]

Description

Imago (fig. 5). Length of forewing 18-21 mm. Head black with very thin pale yellow margins between antennae and around eyes. Patagium black with yellow margins. Antennae black and bipectinate, male with longer pectination than female. Labial palpi black, short and erect. Thorax black, tegula bordered with white or pale yellow. Legs dark grey-brown, inner side of femur and tibia pale yellow. Abdominal segments black, bordered with yellow, distal part of anal segment yellow.

Forewing dark brown. Transversal band consisting of eight white blotches (two in distal part of cell), devided by dark veins. Transversal band connected to large and broad white basal streak between dorsum and cubital

vein, forming a hook-shaped pattern. A thin white stripe along radial vein. Base of forewing dark brown at vein 1. Fringes white.

Hindwing white with dark brown margin (2–2.5 mm). Dorsum and fringes white.

Transversal band on underside forewing not crossed by dark veins. Underside forewing without white stripe along radial vein.

There is hardly any variation in wing pattern.

Male genitalia (figs. 8a–d). Uncus elongate beak-shaped with flattened keel. This keel running from just behind top of uncus to tegumen (fig. 8a). Vinculum with short saccus. Juxta rather broad, Y-shaped, its distal part granulated. Valva with three processes (fig. 8c), very similar to that of *N. kebeae* (fig. 6c). Process on sacculus long. Extension of sacculus with thorn on innerside (in fig. 8c just visible). Extension of cucullus longer than that of sacculus, flattened and bent towards sacculus. Top of this process elongated into sharp point. Sacculus and extension of cucullus with setae. Aedeagus (fig. 8d) very long and curved down, coecum long and curved upwards. No cornuti.

Female genitalia (figs. 9a–b). Apophyses anterior of moderate length, apophyses posterior rather long and thin. Lamella postvaginalis with small and short lunular fold. First half of antrum strongly swollen and large, funnel-shaped. Second half of antrum like a broad ribbon, flat with broad dark chitinous core. Bursa copulatrix with one signum. Signum (fig. 9b) long, at one fourth of length broadened with a tail-like extension, distal part curled at ductus bursae.

Distribution (fig. 10). *Nyctemera warmasina* has only been found near the Anggi Lakes in the Arfak Mountains of Irian Jaya, at an altitude of 1800 meters. It seems to be a rare species, since only 17 specimens are known and no recent material is available.

Remarks. The similarity between the genitalia of *N. kebeae* and *warmasina* clearly shows that these species are very closely related, and one could even doubt that they are different species. Some characters, like the much longer extension of the cucullus in male (fig. 8c) and the larger and swollen antrum in female (fig. 9a), are decisive to accept the species status of *warmasina*. Furthermore the typical wing pattern and the white fringes on both wings (fig. 5) are distinctly different from *kebeae*.

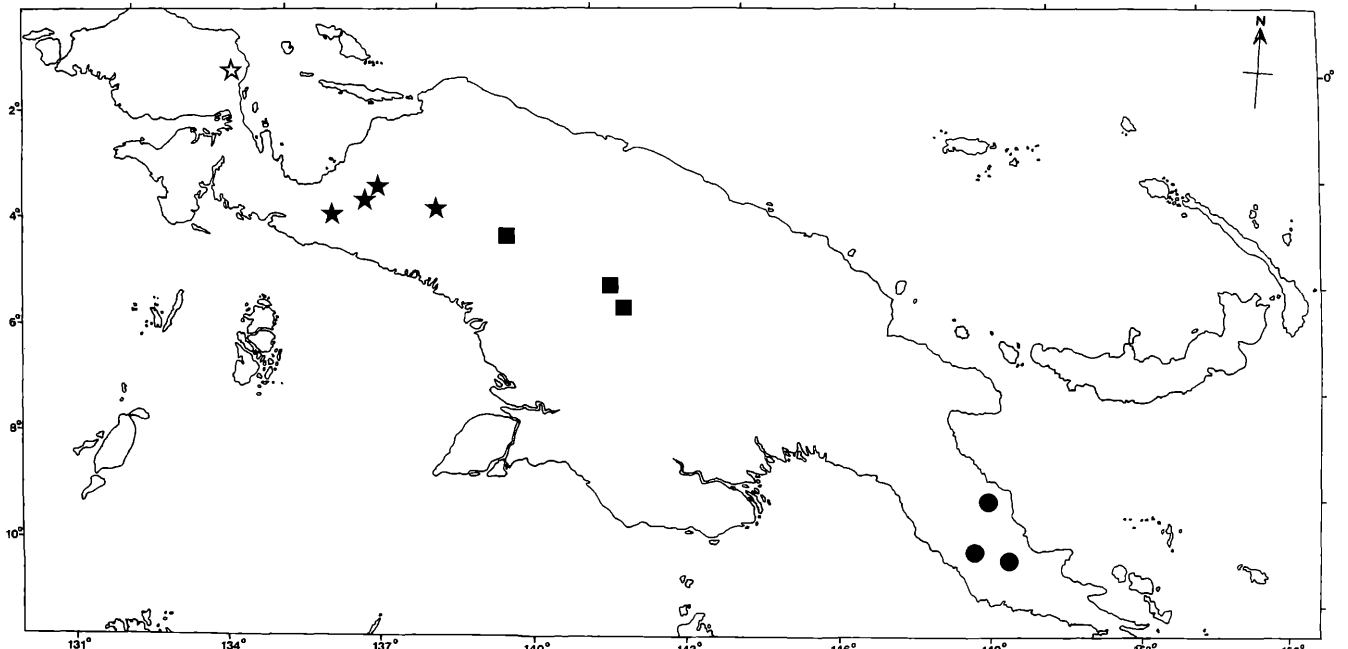


Fig. 10: Distribution of the subspecies of *Nyctemera kebeae* and of *N. warmasina*: ● *N. kebeae kebeae*; ■ *N. kebeae intermedia*; ★ *N. kebeae occidentalis*; ☆ *N. warmasina*.

Etymology. The name *warmasina* refers to the Biak-Papuan word "warmasin", which means "salt water". At many places in Irian Jaya there are salt springs, probably also near the Anggi Lakes. However, the water of these two rather large lakes is neither brackish nor containing any larger amount of salt.

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